

PATENT COOPERATION TREATY

REC'D 19 OCT 2005

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From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/JP2005/000431

International filing date (day/month/year)
07.01.2005

Priority date (day/month/year)
08.01.2004

International Patent Classification (IPC) or both national classification and IPC
C05F7/02, C08K3/22, H01B3/00, C09K5/08

Applicant
SHOWA DENKO K.K.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☒ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☒ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1 bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
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Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

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**Box No. III Non-establishment of opinion with regard to novelty, inventive step and Industrial
applicability**

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

- ☐ the entire international application,
- ☒ claims Nos. 21-38

because:

- ☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):
- ☐ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. are so unclear that no meaningful opinion could be formed (*specify*):
- ☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.
- ☒ no international search report has been established for the whole application or for said claims Nos. 21-38
- ☐ the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:
 - the written form ☐ has not been furnished
 - ☐ does not comply with the standard
 - the computer readable form ☐ has not been furnished
 - ☐ does not comply with the standard
- ☐ the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-*bis* of the Administrative Instructions.
- ☐ See separate sheet for further details

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

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Box No. IV Lack of unity of invention

1. ☒ In response to the invitation (Form PCT/ISA/206) to pay additional fees, the applicant has:
- ☐ paid additional fees.
 - ☐ paid additional fees under protest.
 - ☒ not paid additional fees.
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rule 13.1, 13.2 and 13.3 is
- ☐ complied with
 - ☒ not complied with for the following reasons:
see separate sheet
4. Consequently, this report has been established in respect of the following parts of the international application:
- ☐ all parts.
 - ☒ the parts relating to claims Nos. 1-20

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	6-9,12-14,16-20
	No: Claims	1-5,10,11,15
Inventive step (IS)	Yes: Claims	
	No: Claims	1-20
Industrial applicability (IA)	Yes: Claims	1-20
	No: Claims	

2. Citations and explanations
see separate sheet

Re Item IV

Lack of unity of invention

1) The separate inventions are:

1a) Claims 1-20

The first invention solves the problem of providing an alternative inorganic powder, which is suitable as thermally conductive filler in resin compositions and allows high loading of the resin composition with the filler without causing the viscosity to increase too much.

This problem is solved by the inorganic powder as defined in claims 1-20.

1b) Claims 21-38

The second invention solves the problem of providing an alternative resin composition filled with the inorganic powder defined in claims 1 to 20 having a high thermal conductivity and electrical insulating properties and various products comprising this resin composition.

This problem is solved by the resin composition as defined in claims 21 to 23 and the products comprising this resin composition as defined in claims 24 to 38.

2) Non-unity a posteriori

Motivation of non-unity (Rule 13, PCT).

The problems mentioned above are solved by the two inventions as defined above.

2a) For unity a common concept, which is novel as well as inventive and linking the two inventions as defined above, must exist.

2a1) The common concept linking the two inventions above is the inorganic powder as defined in claim 1 having a frequency-size distribution with multiple peaks, wherein the peaks are present at least in the particle size regions from 0.2 to 2 micrometer and from 2 to 63 micrometer.

**WRITTEN OPINION OF THE
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2b1) EP-A-276321 (see D1; examples 12 to 17) discloses mixtures of an alumina powder with an average particle size falling within the interval 0.2 to 2 micrometer and an alumina powder with an average particle size falling within the interval 2 to 63 micrometer. This mixture is incorporated in resin compositions with the objective of obtaining a high thermal conductivity.

2b2) US-A-6284829, D2 (see D2; claim 9) discloses a filler comprising an inorganic powder with an average particle size of 10 to 40 micrometer and an inorganic powder with an average particle size of 0.1 to 0.5 micrometer. The filler is incorporated in resin compositions with the objective of obtaining a high thermal conductivity.

2b3) EP-A-361109, D3 (see D3; examples 4 and 5 and claim 1) discloses mixtures of a silica powder with an average particle size falling within the interval of 2 to 63 micrometer and a silica powder with an average particle size falling within the interval 0.2 to 2 micrometer.

2c) The common concept linking the two inventions as defined above is therefore known from D1, D2 as well as D3.

2d) No other common concept based upon the technical features of the set of claims appears to exist, which would overcome the non-unity objections made above.

2e) The present application does therefore not satisfy the requirements of Rule 13 PCT as non-unity a posteriori as defined above has been noted to exist.

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

Reference is made to the following documents:

- D1: EP-A-0 276 321 (SHOWA DENKO KABUSHIKI KAISHA) 3 August 1988
- D2: US-B1-6 284 829 (B. DALBE ET AL.) 4 September 2001
- D3: EP-A-0 361 109 (MITSUBISHI KASEI CORPORATION) 4 April 1990

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- D4: EP-A-0 342 141 (INTERNATIONAL BUSINESS MACHINES CORPORATION)
15 November 1989
D5: EP-A-0 265 839 (CALP CORPORATION) 4 May 1988
D6: EP-A-0 469 257 (VEREINIGTE ALUMINIUM-WERKE
AKTIENGESELLSCHAFT) 5 February 1992
D7: EP-A-0 499 585 (CIBA-GEIGY AG) 19 August 1992
D8: US-B1-6 210 520 (J.L. OSUNA ET AL.) 3 April 2001

1) Novelty

Independent product claim 1

1a) D1 (see D1; examples 12-17), D2 (see D2; claim 9) and D3 (see D3; examples 4 and 5 and claim 1) disclose inorganic powders having a frequency-size distribution with multiple peaks, wherein the peaks are present in the particle size region from 0.2 to 2 μm and from 2 to 63 μm .

The subject matter of independent product claim 1 is not novel in view of D1, D2 as well as D3 (Art. 33(2) PCT).

Dependent claims

1b1) The subject matter of dependent claims 2, is not novel in view of D1 (see D1; comparative example 17, Tables 11 and 13).

1b2) The subject matter of dependent claim 3 is not novel in view of D1 (see D1; examples 12-16, tables 7, 8, 11 and 13).

1b3) The subject matter of dependent claim 4 is not novel in view of D1 (see D1; examples 12-16).

1b4) The subject of dependent claim 5 is not novel in view of D3 (see D3; examples 4 and 5).

1b5) The subject matter of dependent claims 10, 11 and 15 is not novel in view of D1 (see D1; tables 5, 7 and 11).

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1b6) The subject matter of dependent claims 6-9, 12-14 and 16-20 is novel in view of the cited prior art documents D1 to D8.

2) Inventive step.

2a) The technical features of dependent claims 6-9, 12-14 and 16-20 are either known from the prior art documents D1 to D8 or appear to be design options obvious for a man skilled in the art (Art.33(3) PCT).